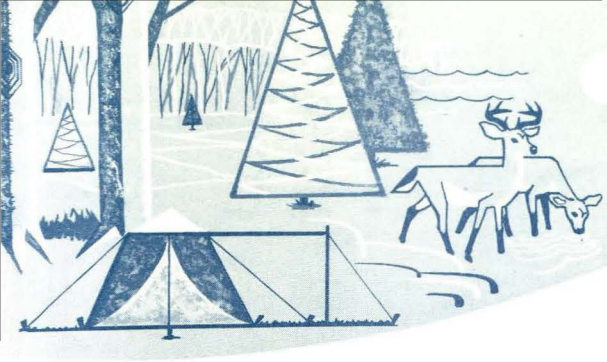

U. S. FOREST SERVICE

RESEARCH NOTE NC-16

NORTH CENTRAL FOREST EXPERIMENT STATION, FOREST SERVICE—U.S. DEPARTMENT OF AGRICULTURE

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Botanical and Commercial Range of Balsam Fir In the Lake States

Accurate maps showing the distribution of important tree species are valuable to foresters, botanists, wildlife specialists, land managers, and others. Although the general natural ranges for our principal tree species have been well known for some time, new information continues to develop. Commercial ranges, however, have not previously been mapped precisely, and artificial extensions of ranges generally have not been mapped at all. For these reasons, range maps of the principal forest tree species have been prepared[1] for the Lake States (Michigan, Minnesota, and Wisconsin), and that for balsam fir (*Abies balsamea* (L.) Mill.) is presented here (fig. 1.).

Accuracy depends in part on the scale of the map being used. On this map, it is not practical to separate out isolated stands except when they are some distance from the main range. Accordingly, the main range boundary as drawn may include several outliers near the edge of the principal distribution.

In the silvical characteristics reports for the Lake States tree species,[2] commercial ranges were mapped (balsam fir, however, was not included), but they were based on the following broad definition: "Commercial range is defined as that portion of the natural range in which the species grows to commercial size and is a major or important species in the type." In the present Note commercial ranges are defined on a wood-volume basis and are indicated for each county that presently has at least 1,000 cords of balsam fir (fig. 1). Counties with 10,000 to 99,000 cords and those with at least 100,000 cords are specially designated. The commercial range is based primarily on published reports of the Forest Survey and is supplemented for completeness by unpublished data from the same source and modified where local information justifies it. For example, reports of the second Forest Survey in southern Michigan (1947-1956) show small volumes of balsam fir in counties south of the known botanical range. This resulted from pooling timber volumes for adjacent lightly forested counties.

The natural range is based on the available published reports[3] as modified by the observations of qualified foresters and botanists.[4] A supplemental map (fig. 2) shows the plots used in making the distribution map. These plots were derived from actual herbarium specimens or from other reliable sources.

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1 *Previously published reports in this series are for jack pine (U.S. Forest Serv. Res. Note LS-15), red pine (U.S. Forest Serv. Res. Note LS-62), eastern white pine (U.S. Forest Serv. Res. Note LS-63), white spruce (U.S. Forest Serv. Res. Note LS-73), and black spruce (U.S. Forest Serv. Res. Note LS-74).*

2 *See Station Paper 67 and related Station papers published by the Lake States Forest Experiment Station.*

3 *Bakuzis, E. V. and H. L. Hansen. 1965. Balsam fir—A monographic review. 445 pp (see pp. 38, 39, 65-70, and 332), illus. Univ. Minn. Press. Minneapolis.*

Dodge, C. K. 1921. Miscellaneous papers on the botany of Michigan. Mich. Geol. and Biol. Surv. Publ. 31, Biol. Ser. 6.

Fassett, Norman C. 1930. Preliminary reports on the flora of Wisconsin V. Coniferales, Wis. Acad. Sci., Arts and Lett. Trans. 25: 177-182, illus.

Hart, Arthur C. 1959. Silvical characteristics of balsam fir, U.S. Forest Serv., Northeast. Forest Exp. Sta., Sta. Paper 122, 22 pp., illus.

4 *Information in this Note has been reviewed by Drs. Edward Flaccus and Paul Monson, University of Minnesota (Duluth); Dr. Egolfs Bakuzis, University of Minnesota (St. Paul); Dr. Thomas Morley, University of Minnesota (Minneapolis); Dr. Edward G. Voss, University of Michigan; Dr. John W. Andresen, Southern Illinois University; staff members of all Divisions of the North Central Forest Experiment Station and of its field offices in the Lake States; staff members of the U.S. Soil Conservation Service in Minnesota; and staff members of the National Forests and State Conservation Departments in Michigan, Minnesota, and Wisconsin.*

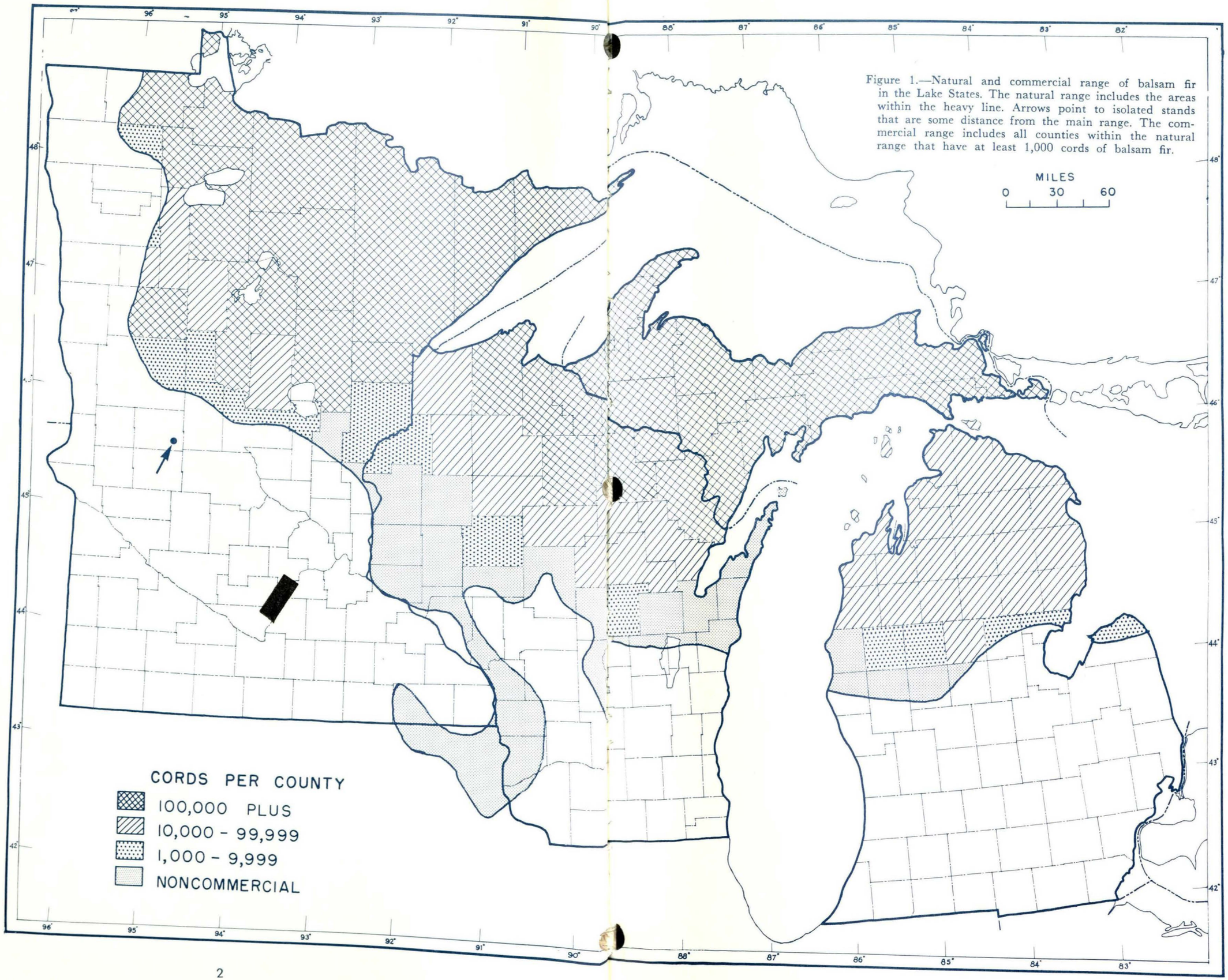

Figure 1.—Natural and commercial range of balsam fir in the Lake States. The natural range includes the areas within the heavy line. Arrows point to isolated stands that are some distance from the main range. The commercial range includes all counties within the natural range that have at least 1,000 cords of balsam fir.

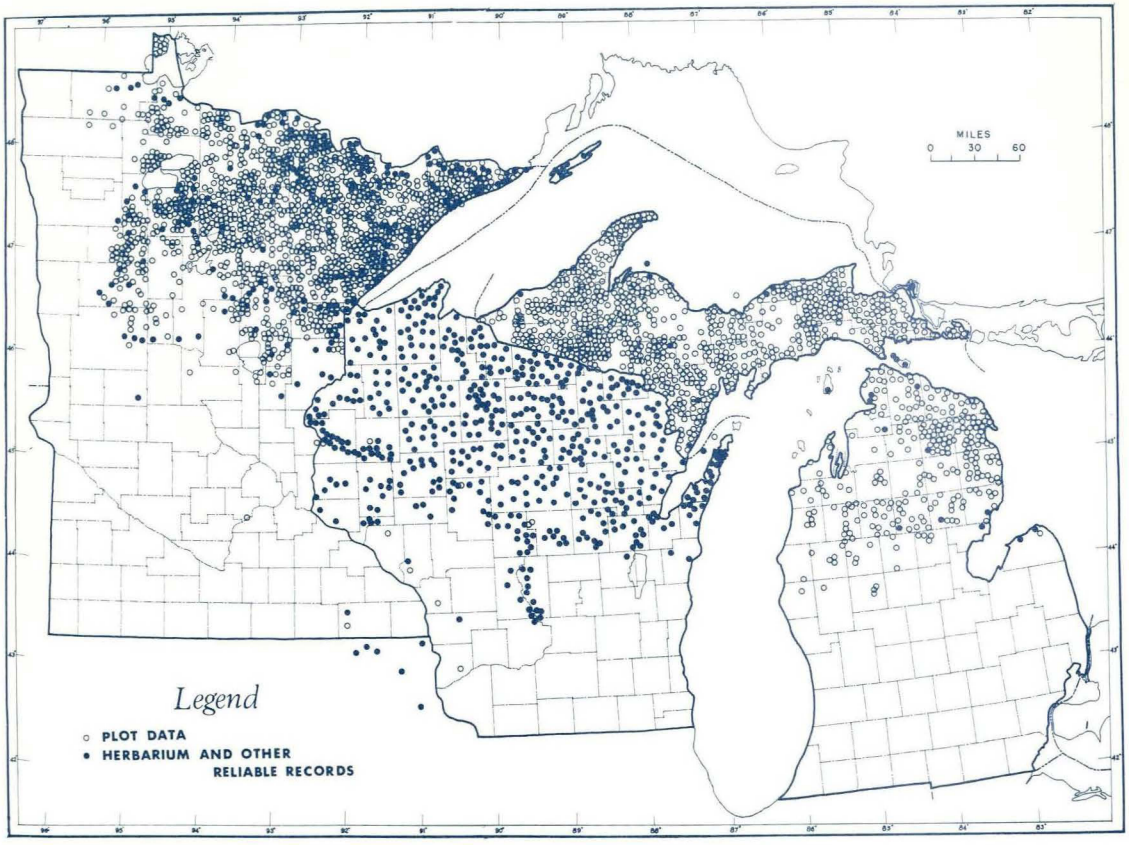

Figure 2.—Localities from which native balsam fir is represented in established herbaria or other valid sources. Includes material from (1) the following herbaria: Cranbrook Institute of Science, Michigan State University, Milwaukee Public Museum, University of Michigan, University of Minnesota (Duluth), University of Minnesota (Minneapolis), University of Wisconsin (Madison), and University of Wisconsin (Milwaukee); (2) seed collection records of the North Central Forest Experiment Station, the University of Minnesota, and Michigan State University; (3) superior tree records of the North Central Forest Experiment Station; (4) a vegetational survey made by Dr. Egolfs Bakuzis of the University of Minnesota; (5) Fassett, 1930 (see footnote 3) for most of the Wisconsin locations; and (6) Forest Survey plots.

Within its natural range in the Lake States balsam fir grows on many types of soil and drainage conditions. It develops best on deep, moist but well-drained loams or silt loams between 4.0 and 6.0 pH and grows well on limestone outcrops in northeastern Wisconsin. It will grow, but more slowly, on gravelly sands, shallow soils over rock, and on peat. Pure stands are not common. As a rule balsam fir grows with one or more associates, the most common of which in approximate order of frequency as they occur on some 2,000 Forest Survey plots are paper birch, quaking aspen, northern white-cedar, white spruce, red maple, yellow birch, black spruce, black ash, sugar maple, balsam poplar, and eastern white pine. Associates vary geographically and according to site conditions. For example, in Michigan eastern hemlock and tamarack, and in Minnesota, basswood, are fairly common associates in addition to the other species listed.

The natural distribution of balsam fir is outlined on the map. Planting of balsam fir has not been extensive. There is little probability, therefore, that artificial regeneration will blur the outlines of the natural range in the foreseeable future, as it may for white spruce and the pines.

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